INF3001H **Foundations of Information** **Fall 2014**

Last edited September 19, 2014

Syllabus

I • Overview

A. *Coordinates*

1. Course:	INF3001H — Research in Information: Foundations
2. Time & place:	Wednesday, 1:00–4:00 p.m., Bissell 312
3. Instructor:	Brian Cantwell Smith
4. Email:	brian.cantwell.smith@utoronto.ca
5. Phone:	416·946·5402
6. Office:	Room 3 (2nd floor), Coach House Institute, 39A Queen's Park Crescent East[1]
7. Office hours:	By appointment (likely Tuesdays 4:30–6:00)

B. *Description:* An introduction to, exploration of, and examination of the fundamental intellectual landscape of information research. Topics include:

1. An historically, conceptually and methodologically grounded understanding of the use of concepts of information and knowledge across the academy (in philosophy, history, social science, politics, engineering, etc.); and
2. Contemporary uses of 'information' as a substantial theoretical notion, both in the world in general (e.g., in public political discourse, in such constructions as "the information or knowledge age, economy, society, etc."), and in such fields as political theory, biology, medicine, computing, etc.

C. *Objectives:* to develop

1. An intellectual/historical *map of the intellectual terrain* comprising information research/studies;
2. A *methodologically neutral* approach to the study of information, able to appreciate contributions to our understanding of information from diverse disciplines and sectors of the academy;
3. A *reflexively critical* appreciation of one's own and other's methods, approaches, perspectives, insights, normative standards, and professional practices;
4. Familiarity with *foundational literature* involving the use of information as a theoretical concept in those aspects of the information sciences and intellectual landscape more generally that are relevant to the areas in which you imagine conducting your doctoral research; and
5. Through participation in a safe and open environment, recognition, strength, and power in your unique scholarly voice (written and spoken).

D. *Outcomes*—to be able to:

1. Compare and contrast different notions of information.
2. Compare and contrast different traditions of information studies.

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[1] A tiny building (aka the "McLuhan Coach House") at the back of the parking lot behind 39 Queen's Park East, on the St. Michael's College campus (E side of Queen's Park). See map and picture on last page.

3. Identify different epistemological traditions.
4. Lead and engage in discussions with peers.
5. Justify a conceptual tradition for your own research agenda.

E. *Students*

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4.	Jamile	Jamile Jaafar	Ghaddar	ghaddarj@gmail.com
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6.	Karolina	Karolina Ewa	Grzeszczuk	karolina.grzeszczuk@mail.utoronto.ca
7.	Rebecca	Rebecca Jane McGuire	Noone	rebecca.noone@mail.utoronto.ca
8.	Ben	Robert Benjamin Housley	Walsh	benjamin.walsh@mail.utoronto.ca
9.	Vik	Vikram	Pant	vik.pant@mail.utoronto.ca

II • Assignments

A. *Participation* Participation in class discussion (worth 10%).

INF3001 is intended to be an intensive seminar. Everyone is expected to participate actively (and come prepared!); the class will be successful only if everyone takes part in the learning and in the discussions.

Participation does not must mean showing up. It requires that you engage in the material and contribute to the collective work in a constructive and critical way. It will be evaluated in part on quantity (how often you engage in discussions, how often you start a discussion, how often you comment on other people's discussion contributions, etc.—but don't take over the class!), but more on quality. Quality is a matter of whether you offer insights that bring discussions forward, whether you ask question that help the class think constructively about the issues, whether you offer insights when the discussion is stuck or off on a tangent, etc.

Here is a useful characterization of participation provided by a previous INF3001 instructor (Prof. Siobhan Stevenson):

a. *Outstanding Contributor* [A or A+]: Contributions in class are frequent and reflect exceptional preparation in nearly every class. Consistently volunteers answers and asks questions that assist the learning of the class as a whole. Class activities are always approached with enthusiasm and diligence. Attends every class session. If this person were not a member of the class, the quality of the course as a whole would be diminished significantly.

b. *Good Contributor* [A-]: Contributions in class are frequent and reflect thorough preparation in nearly every class. Often volunteers answers to questions. Frequently asks questions that assist the learning of the class as a whole. Class activities are almost always approached with seriousness and diligence. Attends nearly every class session. If this person were not a member of the class, the quality of the course as a whole would be diminished.

c. *Adequate Contributor* [B or B+]: Contributions in class are infrequent but reflect adequate preparation. Rarely volunteers answers to questions. Infrequently asks questions, but they are appropriate and helpful to class. Class activities are usually approached with diligence. Absent from a few class sessions. If this person were not a member of the class, the quality of discussion would not be changed.

d. *Non-Participant* [B-]: This person participates not at all in class. Absenteeism is a problem. Hence, there is not an adequate basis for evaluation. If this person were not a member of the class, the quality of discussion would not be changed.

B. *Reflections*

For Parts II and III (from Sept 24 to roughly Oct 29), write a brief reflection (short list or 1–2 paragraphs) about each of the *primary* readings assigned for that week, covering the following points:

a. Paper's main insights,
b. Points of agreement,
c. Points of disagreement, and
d. Questions for discussion.

These reflections are to be posted on the weekly discussion page (on Black Board) by 1:00 p.m. on Tuesday (i.e., 24 hours before class). Students are encouraged to read the reflections of the other seminar members, and come to class prepared to engage.

I imagine something like ⅓ or ½ of a page per reading. Worth 6 × 2.5% = 15%.

C. *Leadership*

Also for Parts II–III, one or two students (assigned essentially at random) will lead the seminar (in cases where a single student is assigned, I will play the role of the second member). Team members may choose to divide the readings, or not; together, however, they must have done all the readings, provide a critical appraisal of each (remember everyone will have read the works so keep these appraisals brief), and develop a list of probes with which to generate discussion.

In preparation, leaders should read the reflections that class members have posted on Blackboard, and use their content to shape and organize the seminar. Doing so will go a long way towards ensuring lively engagement and a meaningful discussion that resonates with the interests of the group as a whole.

Worth 10%.

D. *Paper*

The main assignment is to write a research paper on a topic or area in the foundations of information *that you expect to be relevant to your planned doctoral research*. Total worth: 65%.

Papers should be approximately 5–6,000 words. To the extent that your paper differs from that length (in either direction), it should be correspondingly excellent.

There are four stages to the paper preparation. All will be graded, and feedback provided on all of them.

1. Skeleton

The first step is to submit, on 1 or 2 pages (maximum!), what I call a **skeleton**—a conceptual distillation of the argument to which your full paper will give voice. *Prose will not be accepted.* It should instead be a clear, condensed, skeletal version of the argument to be advanced.

As described in the accompanying handout, skeletons are not *outlines*; nor are they designed for public consumption (with definitions, introductions, etc.). Outlines tend to identify topics or areas for discussion, rather than summarize the claims, arguments, etc., to be made about those topics. In contrast, the skeleton should present, in point-by-point, structured and highly abbreviated form, the full content of the argument to be made. It will consist of *statements* (claims), not merely noun phrases designating a topic or point to be discussed. The entire conceptual structure (including assumptions, theses, arguments—and flaws!) of the paper should be revealed.

   a. Due: Oct. 29; Worth: 5% (I have assigned the skeleton a minimal grade not only because the form is likely to be unfamiliar, but more seriously because they are so deucedly difficult to develop. Still, do the best you can. There will be time during subsequent weeks for you to refine and improve your skeleton. (I believe that developing skill with this form will prove invaluable as preparation for writing a dissertation, and papers for the rest of your life.)
   b. Some (many?) people will not be able to produce such an outline, without first writing a rough draft, in order to know what they are arguing. Fair enough; that is fine to do. But I do not want to see the rough draft, at this point; I want to see only distilled argument structure. So if necessary, write your first draft, and then extract what, exactly, in conceptual terms, the paper aims to accomplish.
   c. Developing skeletons requires a tremendous amount of work. Don't be misled by the fact that the skeleton may be no longer than 1-2 pages. If all goes well, producing the skeleton, short as it is, will be the bulk of the work of writing the paper. Writing the subsequent prose will be easy.

2. First draft Upon submission, each person's draft will be distributed (on a random basis) to three other students, for comments.
   a. Due: Nov 12; worth 10%
3. Comments Comments due on the 3 first drafts that have been assigned to you. You should write detailed annotations, throughout the text, plus some paragraphs of general remarks, as appropriate. I would expect the textual commentary to run to two or three pages (500–1,000 words). Be critical, but in the best sense—i.e., in a positive way. If you see room for improvement, or have suggestions, feel free to give voice to them (the author can always ignore them!).
   a. Due: Nov 19; worth 10%
4. Final draft Due: Dec 15; worth 40%.

E. *Grading* Grades will be based on clarity, imagination, power, and coherence of arguments and insights. I am especially interested in people struggling to give voice to substantial views and problems, rather than "logic-chopping" or piece-wise rearrangement of already established positions. That said, clarity and articulateness are of the very greatest importance.[2]

I will not be reticent in presenting and defending positions, nor do I expect you to be.

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[2] NB: In undergraduate seminars, I often tell students that I will down-grade, by one grade level (from A to A–, from A– to B+, etc.) any paper that presents a view with which I agree, especially one with which we have become familiar in class[2]—in order to discourage attempts to parrot back what I or others said. The goal is to encourage students to manifest ferocious intellectual autonomy in their work. Since you are doctoral students, however, I do not expect any problems in this regard ;-).

III • Practical Issues

A. *Communications:* If you have questions, suggestions, observations, etc. about the course, there is a good chance that others in the class will have the same question—or at least will benefit from the answer. Please therefore either: (i) post questions to Blackboard (in the "Discussion Board" section), or (ii) copy the rest of the class in an email, so that everyone in the class can benefit from your questions and from our answers.

B. *Academic integrity:* The essence of academic life revolves around respect not only for the ideas of others, but also their rights to those ideas and their promulgation. It is therefore essential that all of us engaged in the life of the mind take the utmost care that the ideas and expressions of ideas of other people always be appropriately handled, and, where necessary, cited. For writing assignments, when ideas or materials of others are used, *they must be cited*. Such attention to ideas and acknowledgment of their sources is central not only to academic life, but life in general.

Use of material by others without proper citation—called **plagiarism**—is absolutely forbidden, and considered to be a very grave academic offence. Note that *neither the instructor nor either TA has any discretion whatsoever in dealing with cases of plagiarism. All cases must be reported.* This is a very strict U.of.T rule, to which we, as instructors, are bound. In particular, we are explicitly forbidden from "deciding charitably to let a confused or repentant student off," no matter how much we might otherwise be tempted.

Please acquaint yourself with U.of.T's Code of Behaviour on Academic Matters.[3]

Note that citation is critical whether or not the cited passage or idea has been published. If you rely on an idea suggested by someone else (including any of your classmates), make sure to cite the person and to give them full and appropriate credit (e.g.: Ebenezer Le Page, personal communication, Feb 30, 2015).

C. *Students with a disability or diverse learning styles:* Students with diverse learning styles and needs are welcome in this course. If you have a disability or health consideration that may require accommodations, please approach the instructor and/or the Accessibility Services Office[4] as soon as possible. The Accessibility Services staff are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations. The sooner you let us know about your needs, the more quickly we can assist you in achieving your learning goals in this course.

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[3] http://www.governingcouncil.utoronto.ca/policies/behaveac.htm

[4] http://www.accessibility.utoronto.ca/

Schedule

Part I • Introduction Sept. 10 & 17

A. *September 10 · Backgrounds*

1. The first class will be dedicated to finding out where each of us have come from, what matters to us, what we are interested in, what we are looking for, etc. We will be working closely together all fall, and you seven will be a "cohort" together for a number of years to come. Especially because we are such an interdisciplinary community, it will be useful to have a sense of each person's background, perspective, and intellectual predilections. I would therefore like to ask each of you to come to the first class prepared to speak for 10 minutes on how you see yourself approaching your PhD. Among other things, you should address the following five issues:

   a. *Background:* Previous educational focus (undergraduate, master's, etc.), including department or discipline, topic, claim(s) you argued for in any theses you have written, and the methods or style of work you used and/or are comfortable with—e.g., science, social science (quantitative, qualitative, ethnographic, etc.), humanities, engineering, programming, or whatever.

   You should also mention expertise you come with, which might be of use to others in the class (e.g., you are a master statistician, have translated Hegel into Japanese, can design dynamite web sites and help people with CSS, etc.)

   b. *Plans:* What you expect to focus on, wrestle with, conduct research about, or investigate in the course of your doctoral work—and also, and not incidentally, what *standards* you would like to meet, and what you would like your work to *stand for*.

   (Needless to say, it is early days, so your ideas may well change, over the next couple of years. In fact I hope they do! If they don't, I will feel that the iSchool has let you down. Don't worry, therefore, whether you know what project, topic or even area you want to focus on. I'm just looking for a sense of what *matters* to you, intellectually.)

   c. *Wants*: What sorts of education, understanding, and insight you do *not yet have*—what you do not yet know—that you think you will need to know or understand, in order to do the work you are aiming at to a high standard. I.e., what are you looking for—what can we help you with?

   d. *Foundations*:: What literatures and research (books, papers, projects, etc.) you expect to play a fundamental role in the research you intend to focus on. Though this will include works you have already know, I am especially interested in things you have *not yet read*, but would like to—things you know will be important. We may be able to include some of these in the final syllabus.

   After each presentation, we will have some time for others in the class to ask questions and have a bit of discussion. Among other things, I hope we can use this collective exercise as an opportunity to develop a consensual bibliography for the course.

B. *September 17 · Representation*

P1 Smith, Brian Cantwell, "Rehabilitating Representation" (83 pp); forthcoming in Smith, Brian Cantwell, *Indiscrete Affairs, Volume II.*

This is a long and not particularly easy paper. It is also a *draft*, and so I would be grateful for recommendations on how it should be edited/amended/improved.

What I want to do in class on Sept 17 is to lay out what I take to be the fundamental dialectic that I believe underlies all forms of information, representation, language, and thought—essentially the complex interplay between the constraints of effective embodiment or physicality, on the one hand, and the long-distance and non-causal "reach" of semantic or intentional phenomena, the fact that they can refer to, be about, or otherwise "reach out" to objects, events, and phenomena far away in time, space, and possibility.

Part II — Foundational Issues of Information Sept 24 — (roughly) Oct 29

The aim of Part II is to look in some depth at three issues that underpin contemporary theories and conceptions of information:

1. *Semantic* theories of information, largely developed within philosophy, which attempt to understand how it is that information is a semantic or semiotic or intentional notion, and thereby to account for the fact that information, in an informal sense, is *about* something—that information has *meaning* or *content*.
2. *Quantitative* theories of information—an approach initiated in 1948 by Claude Shannon, which has since spread throughout computer science and physics, and that is considered by many (perhaps even most) theorists and academics outside of information schools, and by some within the iSchool and LIS traditions, simply to be *the* theory of information. As distinct from semantic theories, quantitative theories do *not* theorize information content, but instead ask questions about *how much* information is in a repository, or transmitted across a channel, etc. This is the theory that has given us measures of disk capacity (e.g., 6 TB), channel bandwidth (10 GBit/sec), etc.
3. The notion of *digitality*, which almost all theories of information (and computing, and the internet, and information technology) assumes, but which is remarkably little theorized.

Conceptual prowess with these three notions will provide you with sound conceptual tools to look at more contemporary accounts of information and its use, including in social, political, and cultural discourse.

Part II · A — Semantic Theories of Information

1. In this section we look at semantic conceptions of information, and their applicability to information technologies and systems. Some questions we might focus on include:
   a. What is the semantic conception of information?
   b. Can information, semantically conceived, actually *do* anything?
   c. What truth, relevance, and utility is there to the "information processing" characterisation of computing technology and associated socio-technical practices?
2. I would structure your reading so as to maximize the relevance of these readings to your research. So for example:
   a. In the Dretske précis (P3): focus on the account of information (up to p. 176); don't worry so much about the move into knowledge, perception, and belief, in later pages.
   b. In the Israel & Perry (R5), don't worry about their formalism (i.e., the discussion on pages 7-15). You will want to look at their passages about the "helpfulness" of information, though, and about the circumstances in which one might need to use *representation* (15-18).

And so on. Some things to think about are issues such as the following:

a. Whether, and the extent to which, these writers take information to be "prior to" or "independent of" such (other?) intentional notions as representation, interpretation, etc.

b. How these approaches mesh, conflict with, violate, reconstruct, run roughshod over, and so on, what you would take be important about information.

3. Readings · Primary

P2 Barwise, J., & Seligman, J. (1997). *Information Flow: The Logic of Distributed Systems.* Cambridge University Press. Read: Lecture 1 (pp. 3–25).

P3 Dretske, F. I. (1983). Précis of *Knowledge and the Flow of Information. Behavioral and Brain Sciences*, 6, 55-91. Reprinted in Hilary Kornblith, ed., *Naturalizing Epistemology.* Cambridge: MIT Press, 1985. (This is a précis of Dretske, F. I. (1981). *Knowledge and the Flow of Information.* Oxford: Blackwell.)

P4 Dretske, F. (1990). Putting Information to Work. In P. Hanson (Ed.), *Information, Language, and Cognition* (pp. 112-124); with reply by Smith, B. C. (1990). Putting Dretske to Work (pp. 125-140). Vancouver: University of British Columbia Press.

P5 Israel, D., & Perry, J. (1990). What is Information? In P. Hanson (Ed.), *Information, Language, and Cognition* (pp. 1-28). Vancouver: The University of British Columbia Press.

4. Readings · Secondary

S1 Floridi, Luciano. Semantic Conceptions of Information. Stanford Encyclopedia of Philosophy. Available at: http://plato.stanford.edu/entries/information-semantic/

S2 A recent collection on the philosophy of information, with many further links, can be found in the 19 papers in Adriaans, Pieter & van Benthem, Johan, eds. (2008). *Philosophy of Information.* North Holland, which is available (for download) through the UofT library system at: http://simplelink.library.utoronto.ca/url.cfm/116073

NB: For those of you with social science and/or discursive backgrounds, these readings may seem dense, obscure, technical, and to lack an ounce of sociality in their intuitions and insights. Other things we read will seem “off” in different ways; part of the point of the course, though, is to develop familiarity with multiple perspectives and methodologies. In the meantime, in case it helps, I will quote a couple of paragraphs from a paper I wrote some years back:[5]

> “Everyone’s right.” Or anyway that’s what I tell my students. “Look,” I say; “this paper you are reading was written by a dedicated, intelligent person, who has devoted their life to studying these issues. The author’s had an insight, uncovered some subtlety, which they’re trying to tell us about. Imagine that they’re showing us a path through the forest. Problem is, people write in *words*; and words are blunt instruments: intellectual bulldozers, Caterpillar D9s—big bruisers, that cut wide swaths. Rare persons—poets, mostly—can wield words with enough finesse to clear a delicate trail, without doing too much collateral damage. But most of us, when we write, even when we think we are navigating a exquisite line, are in fact unwittingly mowing down trees, ripping up the earth, sewing all kinds of destruction.

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[5] Smith, Brian Cantwell. “Cummins—or Something Isomorphic to Him,” in Hugh Clapin (ed.), *Philosophy of Mental Representation*, Oxford Univ. Press, 2002, pp. 170–90 (commentary through p. 218).

> "So here's my advice," I go on. "Don't assume this text is written in a language you know, and take your task to be one of figuring out whether they've written is true or false. You will almost certainly judge it false. Be more generous! Assume what you are reading is true, and tell me what language it is written in. Ignore the ancillary damage; pointing that out is easy, and anyway that stuff will grow back. Figure out what the author was on to—what they were excited about, what wonder they have seen. Tell me, if we were to follow their path further, where it would lead."

Part II · B — Quantitative Theories of Information

1. Overview
   a. We turn next to the *quantitative* theory (or theories) of information, introduced by Claude Shannon in 1948. This section will be challenging in a number of ways—in part because these are (by far!) the most technical papers we will encounter, but perhaps more importantly because it may not be clear to some of you how these quantitative measures will relate to your research. Nevertheless, it is important that, as an iSchool student, you not only know that this (large) body of theory exists, but have a sense of what it is about.[6]
   b. Whether we will spend one or two weeks on this material will depend in part on what you make of it all. My own emphasis will be on (i) its conceptual assumptions, (ii) the insights it embodies, based on those assumptions; (iii) what aspects of information it "foregrounds" and what other aspects it "disappears"; and (iv) the ways it has been used in computer science and other technical fields.
2. Readings · Primary

The original Shannon papers were originally published in 1948 in two parts in the *Bell System Technical Journal*, [P8], below. It was then republished a year later together with an introduction by Warren Weaver [P7].[7] About six or so years after information theory made its debut—to enormous acclaim—Shannon wrote a very interesting one-page editorial, included below as [P9].

If you are not familiar with these papers, I recommend that you look at them in this order:

P6 Verdu, Sergio, "Guest Editorial" to (RNN), below (pp. 2042–2044 in the IEEE transactions).

P7 Weaver, Warren (1949). Recent contributions to the mathematical theory of communication. In [3], below, pp. 1–16. Available from

http://academic.evergreen.edu/a/arunc/compmusic/weaver/weaver.pdf

P8 Shannon, Claude E (1948). A mathematical theory of communication. *Bell System Technical Journal*, 27 (July and October), 379–423 & 623–656. Corrected version available at:

http://cm.bell-labs.com/cm/ms/what/shannonday/shannon1948.pdf

P9 Shannon, Claude E. (1956). "The Bandwagon," *IRE Transactions on Information Theory* **2**:3 (◆)

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[6] Note, too, that although I am a computer scientist I am not a professional mathematician.

[7] For completeness, I have included a reference to the resulting book as S3, below, under secondary readings; its content is merely R7 plus R8.

P10 Adriaans, Pieter, "A Critical Analysis of Floridi's Theory of Semantic Information," *Knowledge, Technology, & Policy* (2010) 23:41–56.

P6 and P9 comprise only 3 pages total, so you won't have any difficulty reading them through.

P7 and P8, in contrast, are a lot tougher. *I do not expect you to read and understand the mathematics*. Read them as far as you can—Weaver (P7)at least up to the middle of p. 8, for example—but at a certain point those of you who aren't mathematically inclined will run into inscrutable formulae. Nevertheless—and this is the important thing—*even if you don't follow any of the subsequent mathematics*, I strongly suggest that you to continue to "read through" the rest of both articles, in order to see what the two authors are concerned with, what notions are being bandied about, etc. It is exactly in order develop some familiarity with (and prowess in) "taking stock of foreign literature" that I am assigning this literature.

P10 is a very interesting article arguing *against* the semantic theory of information; especially from §4 on it is clear and useful as one way of characterizing the debate between the two conceptions. I profoundly disagree with Adriaans (I *also* disagree with Floridi, but I do believe that information is fundamentally a semantic/intentional notion).

What I will be most interested in, in class, is what you have been able to glean from these readings, without delving into mathematical niceties.

3. Readings · Secondary
   a. The book containing P7 and P8, mentioned above:

      S3 Warren Weaver and Claude E. Shannon, The Mathematical Theory of Communication, Urbana, Illinois: University of Illinois Press, 1949 (republished in paperback 1963).

   b. Some further bibliographic information on Shannon is available at:

      S4 http://cm.bell-labs.com/cm/ms/what/shannonday/paper.html

   c. A complete collection of Shannon's work is available at:

      S5 http://www2.research.att.com/~njas/doc/shannon.html

   d. A standard textbook on "information theory":

      S6 Cover, Thomas M. & Thomas, Joy A. (2006), *Elements of Information Theory*, 2nd edition. John Wiley & Sons.

   e. An old popular book-length intro is (there may be better ones now):

      S7 Pierce, John R. (1961) *Symbols, Signals, and Noise: The Nature and Process of Communication*. New York: Harper. (◆)

   f. Finally, for any of you who may be interested, here is some introductory material on Kolmogorov complexity and the algorithmic information theory—developments of Shannon information theory in more contemporary computer science:

      S8 Chaitin, Gregory (1977). Algorithmic information theory. *IBM Journal of Research and Development* 21, pp. 350-359, 496. Available from http://cs.umaine.edu/~chaitin/ibm.pdf

      S9 Grünwald, Peter & Vitányi, Paul (2008). Kolmogorov Complexity and Information Theory: With an interpretation in terms of Questions and answers. http://130.95.1.138/reference/paper/233281707.pdf (Note: what appears to be an earlier version of the same paper, under the title "Shannon Information and Kolmogorov

Complexity," is available from: http://arxiv.org/pdf/cs/0410002v1).

S10 Kirchherr, W., Li, M., & Vitányi, P. (1997). The Miraculous Universal Distribution. *Mathematical Intelligencer*, 19(4), 7-15. Available from: http://www.cwi.nl/paulv/papers/mathint97.ps

S11 Li, Ming & Vitanyi, Paul (1997). *An Introduction to Kolmogorov Complexity and Its Applications*, 2nd Edition. Springer Verlag.

Part II · C — Analyses of Digitality *Late October*

1. *Overview:* Digitality is one of the most common and important ideas underwriting the rise of information as a technical notion, and the information revolution in general. (On Sept. 19, 2014, a quick search in the book section of Amazon returns 4,681,737 results.) Informally, almost everyone has a general sense of what it means to be "digital"—but the term is applied with very little sophistication. In particular, one of the most important things one needs to learn is that things are not "digital" in and of themselves, but *only with respect to this or that aspect*. Even things we generally consider digital (such as DVDs and computer programs) are only digital in some senses, and not in others).
2. Readings · Primary

P11 Haugeland, John, Chapter 2 ("Automatic Formal Systems") of *Artificial Intelligence: The Very Idea*, Cambridge, MA: The MIT Press/A Bradford Book (1985), pp. 47–84. (New edition: 1989; I don't know whether the page numbers are the same.)

Haugeland's *AI: The Very Idea* is a great conceptual introduction to Artificial Intelligence; it is the book I most recommend to outsiders to convey a sense of what AI is, and what it is up to (it is accessible to the average reader of the *NYT Book Review*). Note that Haugeland did not believe in AI (he was a strong Heideggerian), though that may not be evident in this chapter.

P12 Goodman, Nelson, Chapter 4 ("The Theory of Notation") of *Languages of Art*, Indianapolis and New York: Bobbs-Merrill (1968), pp. 127–173.

A useful analysis and set of distinctions relevant to the analog/digital debate. A little tough to read, given Goodman's nominalism (and ego, though neither is as distracting in this chapter as elsewhere in the book), but well worth the effort. Though Goodman is no computer scientist, the analysis is more careful than usual—perhaps the most careful account of digitality of which I am aware—and is certainly applicable to the computational case. Note that he applies the basic notion of discreteness *twice*—once at the syntactic level, once at the semantic level—in contrast to Haugeland, who provides only a single-level analysis (this stems from Haugeland's idiosyncratic treatment of formality).

P13 Lewis, David, "Analog and Digital," *Nous*, **v**:3 (Sept. 1971), pp. 321–327.

A short, clear paper, that pretends in part to be a critique of Goodman, but is in fact an analysis of a very different set of intuitions. Where Goodman is concerned with the difference between discreteness and continuity, Lewis attempts instead to reconstruct the difference between analog and digital computers. The paper is useful in part simply because it is instructive to see the two distinctions part company—quite apart from whether one ends up agreeing with Lewis' talk of "multi-digitality."

P14 Haugeland, John, "Analog and Analog," *Philosophical Topics* (Spring 1981); reprinted in J.

I. Biro & Robert W. Shahan, (eds), *Mind, Brain, and Function: Essays in the Philosophy of Mind*, Norman, Oklahoma: University of Oklahoma Press (1982), pp. 213–225; and also as chapter 4 in Haugeland, John, *Having Thought: Essays in the Metaphysics of Mind*, Harvard Univ. Press (2000), pp. 75–88.

A terrific short paper. Not just a summary of Haugeland's own analysis of digitality, but a useful reply to and critique of both the Goodman (R23) and the Lewis (R24). The real significance, however, comes in the last few pages, in Haugeland's discussion of second-order versions of digital and analog—something that I think is an extraordinarily important idea (though I profoundly disagree with the claims he then makes in its terms about computing).

P15 Smith, Brian Cantwell, "Indiscrete Affairs" (or possible "The Devil in the Digital Details")—unpublished mss, to be merged and published in a collection (of the same name) from Harvard University Press.

I gave a simple version of this material in a talk called "Indiscrete Affairs (or: Is All This Stuff Really Digital, After All?)", at a Library of Congress Symposium on "Our Digital Future" in Washington, DC in 2005, broadcast by CSPAN, available at:

rtsp://video1.c-span.org/project/digital/digitalfuture013105.rm

3. Readings · Secondary

The following two readings are not assigned (and therefore are not pieces on which you need write a summary), but may be of interest for those interested in digitality in the realm of cognitive science and mind:

S12 Dretske, Fred I., "Sensation and Perception," Chapter 6 of *Knowledge and the Flow of Information*, Cambridge, MA: The MIT Press (1981).

As Dretske himself admits, a use of "familiar terminology—analog vs. digital—in a slightly unorthodox way." Important, though, because it points to some of the consequences of digital representation—particularly the sense or intuition that when you have extracted digitally encoded information you have in some sense "bottomed out" in terms of wringing everything from the representation that is there to be wrung. Dretske also makes the remarkable claim that the fundamental difference between perception and cognition is that perception deals with information encoded in analog form, whereas cognition deals with it digitally. The boundary between perception and cognition, therefore, is according to Dretske the process of converting from analog to digital representation. As usual, although the discussion is not conducted in computational terms, the morals are relevant to the computational case.

S13 Fodor, Jerry A., and Ned J. Block, "Cognition & the Analog/Digital Distinction," unpublished ms.

In this unpublished manuscript (of mediocre print quality—sorry about that) Fodor and Block disagree not only with Lewis, but also with any intuitive connection between the analog/digital distinction and the continuous/discrete distinction. Instead, they tie their notion of analog to whether a machine's state transitions are law-like, under the appropriate description.

Part III —Public Accounts of Information Before and after Fall Break

Given the conceptual resources we will have developed in Part III, it will be interesting to read a number of accounts of information not written for philosophical attention, but that present conceptions of information to more general audiences. I have included Geoff Nunberg's and Paul Duguid's UC Berkeley course, along with a number of other writings that I believe are essential for iSchool doctoral students to know.

NB: Since you will now be working on skeletons and papers, reflections will no longer be required.

1. Readings · Primary

P16 Nunberg, G. (1996). Farewell to the information age. In G. Nunberg (Ed.) *The Future of the book*. University of California: Berkeley, CA.

P17 Frohmann, Bernd, *Deflating Information,* Intro and some chapters (to be determined)
This book is available at the following URL (make sure you click on the "Read this book" tab near the top):

— http://simplelink.library.utoronto.ca/url.cfm/122278

The book is interesting (and important) because it is not alone, within the overall community, in arguing against rallying around the notion of information, viewed as excessively (even: perniciously) abstract, in favour of the concrete materialities of the document. you might want to read the introduction (pp. 3-22):

P18 Gleick, James: *The Information*. Knopf, 2012. 544 pp.

P19 Floridi, Luciano, Information: *A Very Short Introduction*, Oxford, 2010.

P20 Geoffrey Nunberg & Paul Duguid: “History of Information,” an undergraduate class given at the University of California, Berkeley.

α. Syllabus: http://blogs.ischool.berkeley.edu/i103s13/syllabus

β. Lectures: Mostly available on line. See table on next page for individual lectures.

χ. Contents:

1. Introduction: Why “History of Information?”
2. The “Age of Information”
3. Technological Determinism
4. First Technologies: Writing
5. Cultural Effects of Writing
6. Manuscript Culture
7. Print ‘Revolution’
8. Scientific ‘Revolution’
9. Emergence of the Public Sphere
10. Reference Books and the Organization of Knowledge
11. Rise of Literacy and Standard Language
12. Unnoticed Revolutions? Time and Money
13. Communications “Revolution”
14. The Telegraph in China (Optional)
15. Literacy and the Nineteenth Century Public Sphere
16. Technologies of the Image

17. Information as Property
18. Broadcast
19. Computer "Revolution"
20. Visualizing Information
21. Storage and Search
22. Advent of the Internet
23. Social Implications of the Internet (Part 1)
24. Big Data
25. Social Implications of the Internet (Part 2)
26. Social Implications of the Internet (Part 3)

Part IV — Information in the Social Sciences

To be determined, based on discussion over the previous weeks.

Appendix A — Duguid & Nunberg: "History of Information"

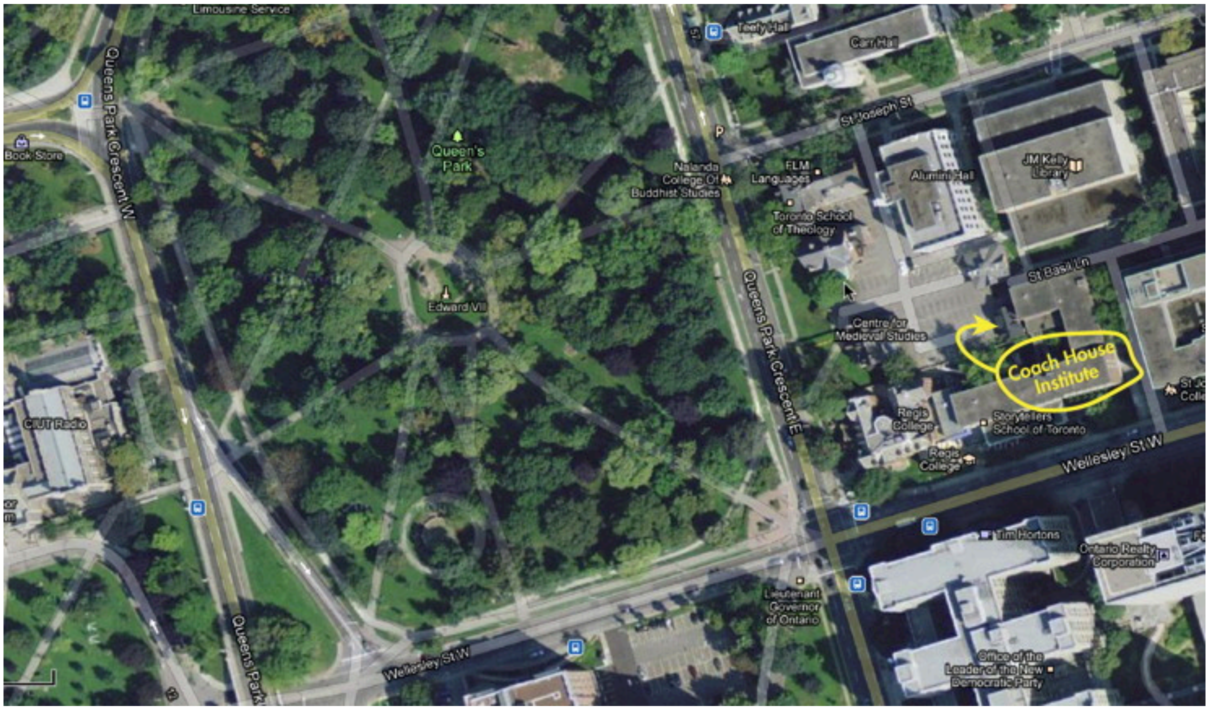
Paul Duguid and Geoffrey Nunberg: "History of Information," University of California at Berkeley

INF3001 — Sept 15, 2014

#	2011	2012	2013	2014
1		http://www.youtube.com/watch?v=0PjN4pfdPsA	http://www.youtube.com/watch?v=F_EwSiqTDn0	http://www.youtube.com/watch?v=rICKSsweJCE
2	http://www.youtube.com/watch?v=6iXxu12nEK4	http://www.youtube.com/watch?v=VO29_dlz57E	http://www.youtube.com/watch?v=lxG4VK2Tr1Y	http://www.youtube.com/watch?v=7V0hTXk58F8
3	http://www.youtube.com/watch?v=h08vnJ-Lc48	http://www.youtube.com/watch?v=TK5ZJ_JA_mA	http://www.youtube.com/watch?v=Q8pVVn55bOc	http://www.youtube.com/watch?v=CuGmjffX3fQ
4	http://www.youtube.com/watch?v=wS31ynBqTZg	http://www.youtube.com/watch?v=BHsyCyAV1mU	http://www.youtube.com/watch?v=ZOsvUtu7eHo	http://www.youtube.com/watch?v=GPaNYBbbXhE
5	http://www.youtube.com/watch?v=MlXNgqNLM14		http://www.youtube.com/watch?v=C3EM-7lBY7o	http://www.youtube.com/watch?v=WgMpYzP3k0Y
6	http://www.youtube.com/watch?v=m7qtY5wZcFs	http://www.youtube.com/watch?v=R4RhP91VcAA	http://www.youtube.com/watch?v=0Ew8ZGxOxrc	http://www.youtube.com/watch?v=rWWtuaykrEk
7	http://www.youtube.com/watch?v=zgDsmARaGqU	http://www.youtube.com/watch?v=aXQq_OIRIM8	http://www.youtube.com/watch?v=p9zDl005g2Q	http://www.youtube.com/watch?v=24dCIj-hlLc
8	http://www.youtube.com/watch?v=V-Da0jZgm6Q	http://www.youtube.com/watch?v=VHlcrYgjCDM	http://www.youtube.com/watch?v=CEDxnWO_wfs	http://www.youtube.com/watch?v=83MnLn45ZgE
9	http://www.youtube.com/watch?v=wiu4FHOHwPo	http://www.youtube.com/watch?v=abZ04f15ASk	http://www.youtube.com/watch?v=hbkSRjybHJI	http://www.youtube.com/watch?v=SIQhw-C9We4
10	http://www.youtube.com/watch?v=srt5-gYu6so	http://www.youtube.com/watch?v=dPMYCTMQSOs	http://www.youtube.com/watch?v=bjNREJEZGtI	http://www.youtube.com/watch?v=XQzU6yGFBks
11	http://www.youtube.com/watch?v=5FEL17ad2pI	http://www.youtube.com/watch?v=VpT0gbWo7Qo	http://www.youtube.com/watch?v=9FxjnUu3E3U	http://www.youtube.com/watch?v=OR_kR0gADDE
12	http://www.youtube.com/watch?v=db4dLlmD9G8	http://www.youtube.com/watch?v=wbVO5AKOAYM	http://www.youtube.com/watch?v=3wq9tosnLAE	http://www.youtube.com/watch?v=bkQ6cdUsKY0
13		http://www.youtube.com/watch?v=vHlrk6cNcdQ	http://www.youtube.com/watch?v=VsZqC1XYhkM	http://www.youtube.com/watch?v=rAopcuU04wY
14		http://www.youtube.com/watch?v=oxE6rsFtKx4		http://www.youtube.com/watch?v=Abf3l2VTvF8
15	http://www.youtube.com/watch?v=VM-8A5Jmo7c	http://www.youtube.com/watch?v=sA9fazTAOyE	http://www.youtube.com/watch?v=_jHibVPvdFI	http://www.youtube.com/watch?v=5KxFlW7yqM4
16	http://www.youtube.com/watch?v=bWOeHfbk2QQ	http://www.youtube.com/watch?v=3AZvcWcmoWM	http://www.youtube.com/watch?v=SMuX9Vozw-s	http://www.youtube.com/watch?v=FjOFIx41Snc
17	http://www.youtube.com/watch?v=4ZOpXl2ADNs	http://www.youtube.com/watch?v=IixPMW_oFpY	http://www.youtube.com/watch?v=sY2-BR05zQw	http://www.youtube.com/watch?v=ux0GhTDpfqo
18	http://www.youtube.com/watch?v=n_35zyAllGs	http://www.youtube.com/watch?v=ZxJ_jn2QFxQ		http://www.youtube.com/watch?v=OYQRzPtVsUY
19		http://www.youtube.com/watch?v=pO9BtDMWaFE		http://www.youtube.com/watch?v=a8-wfY331lg
20	http://www.youtube.com/watch?v=iS9d4sySg-w	http://www.youtube.com/watch?v=7Zkc08Q6byc		http://www.youtube.com/watch?v=HH04WLa1b10
21	http://www.youtube.com/watch?v=ldY9ksSzhOM	http://www.youtube.com/watch?v=GeqGtzlsK98	http://www.youtube.com/watch?v=2nvLDMs586E	http://www.youtube.com/watch?v=InkA855L8DQ
22		http://www.youtube.com/watch?v=je4_9_fw27U	http://www.youtube.com/watch?v=CgCqLG5hXrc	http://www.youtube.com/watch?v=IDIGCnkiUqE
23	http://www.youtube.com/watch?v=tfMezkaQ9GE	http://www.youtube.com/watch?v=VqnJF7YopYE	http://www.youtube.com/watch?v=xkciD-SsqqA	http://www.youtube.com/watch?v=zegHBipq6og
24	http://www.youtube.com/watch?v=nUU4DnzwB2M	http://www.youtube.com/watch?v=1ql0eJu9Sb0	http://www.youtube.com/watch?v=jT9TrYFswE8	http://www.youtube.com/watch?v=GAMXnR84mmE
25	http://www.youtube.com/watch?v=GEE3tokbNEY	http://www.youtube.com/watch?v=f7eV3qXoEoA	http://www.youtube.com/watch?v=pwlplnDkMjI	http://www.youtube.com/watch?v=oCcCBSCTL-w
26	http://www.youtube.com/watch?v=hhYfN18VUeU	http://www.youtube.com/watch?v=ZwAUujAl9fU	http://www.youtube.com/watch?v=Kte9_gaJbc0	http://www.youtube.com/watch?v=iqfDfNiLJRs
27	http://www.youtube.com/watch?v=ncLabOiCCT8	http://www.youtube.com/watch?v=3inU60bXMcE	http://www.youtube.com/watch?v=-hD5PAYoixM	
28				
29			http://www.youtube.com/watch?v=ro_EVhb3ZCY	
30			http://www.youtube.com/watch?v=ewh2Mn7Ypjk	

Appendix B — Coach House Institute

Where it is (39A Queen's Park Crescent East):



What it looks like: